contract research & technology program

office of naval research ONR-1

department of the navy, arlington, virginia 22217

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Foreword

Since its inception, ONR has represented the Navy in science, coordinated naval scientific research, maintained liaison with the scientific community and cooperated with other government agencies in furthering research.

ONR carries out its research through naval laboratories and by awarding contracts to university, industrial and nonprofit organizations. Although these contracts are usually awarded in response to unsolicited proposals, ONR makes every effort to publicize its research needs so that its programs and interests can be taken into account by prospective contractors.

This brochure is intended to provide prospective ONR contractors with brief preliminary information to aid them in preparing and submitting a research proposal. ONR research interests and philosophies, ONR contract requirements and ONR addresses are presented.

Introduction

The Office of Naval Research is directed by the Chief of Naval Research, who reports to the Secretary of the Navy through the Assistant Secretary of the Navy (Research, Engineering and Systems).

The Office of Naval Research sponsors long-range scientific research, applied research and exploratory development which offer potential for advancement and improvement of naval operations. Research funded by ONR is conducted under contract by universities, nonprofit institutions, and industrial establishments, and by Navy laboratories, including ONR's own laboratories.

Two major types of programs are supported by ONR. First, a long-range research program is conducted to acquire fundamental knowledge that may be applied to the solution of Navy problems. Second, a program of applied research and exploratory development is conducted to transition scientific advances into applications that satisfy the technological and operational needs of the Navy and the Marine Corps. Contracts are generally awarded in response to unsolicited proposals. Each proposal is evaluated on the scientific merit of the proposed research program, the qualifications of the investigators, the facilities available to conduct the proposed research and its relevance to Navy needs.

An ONR objective is to use flexible contract and grant procedures in carrying out its program. The ONR Acquisition Directorate negotiates and awards contracts and grants to organizations whose proposals are recommended by the Research and Technology Directorates after receiving favorable scientific and technical evaluation. The contracts and grants are usually assigned to field organizations for administration. These field organizations include ONR Detachments, Branch and Area Offices, ONR Resident Representatives, and other Department of Defense Contract Administration Services.

Research sponsored by the Office of Naval Research often results in inventions. Rights to these inventions are determined by the terms and conditions of the particular patent rights clause included in the contract or grant. It is important that the Government and contractor or grantee know and exercise their rights in order to ensure the expeditious availability of the inventions to the public, and to enable the Government and the public to avoid unnecessary payment of royalties and to defend against claims and suits for patent infringement. In this regard, the Patent Counsel for the Office of Naval Research and Patent Counsel for the ONR field offices are available to answer questions of the contractors or grantees on matters involving inventions or patents.

Contract Research and Technology Program

Research Programs, Code 400
Director, Dr. E. I. Salkovitz
(202) 696-4101

Technology Programs, Code 200
Director, Dr. John O. Dimmock, Acting
(202) 696-4224

Responsibility for scientific and technical management of the ONR contract program rests with the Director, Research Programs and the Director, Technology Programs. Negotiation, execution, and administration of ONR contractual documents are the responsibility of the Director, Acquisition Program.

The ONR research and technology staffs, comprised of scientists and engineers who serve as scientific and technical program administrators, work to develop the scope and quality of the technology base on which the designers and builders of future naval capabilities may draw. It is their responsibility to maintain awareness of the progress, trends and accomplishments of science and technology in their particular fields and to maintain contact with potential investigations in those fields. They review proposals submitted by prospective contractors, select those most promising to their program and most relevant to anticipated Navy needs, and monitor progress of contracted work.

Recently there has been a reorganization of ONR. The Research Programs are now administered by four Directorates, each consisting of two or three Divisions. The following pages contain a listing of these organizations and the programs of continuing interest to ONR which are their responsibilities.

In addition, considerable research crossing scientific disciplines is sponsored by these Directorates because of the increasing sophistication of research techniques and the awareness of interdependence among the scientific fields. The following descriptions of programs emphasize principal thrusts; however, each program continually seeks innovative ideas in other areas. Moreover, each Directorate supports interdisciplinary efforts among its programs or with the programs of other ONR divisions or Government agencies.

ONR has several special programs which cross organizations and disciplines. Three of these are described below.

Selected Research Opportunities

Every other year (1982, 1984, . . .) ONR announces in a separate brochure several research topics to be supported under the Selected Research Opportunities (SRO) program. SRO is part of the Contract Research Program with emphasis on larger, multidisciplinary efforts and cooperative research with Navy laboratories and industry. Brochures may be obtained from the Office of Naval Research, Code 400R1, 800 North Quincy Street, Arlington, Virginia 22217, telephone (202) 696-4108.

ONR Graduate Fellowship Program

As a means of increasing the number of people trained in scientific and engineering areas critical to the Navy, ONR has initiated a fellowship program to support recent college graduates in the study and research leading to a doctoral degree in selected fields which are announced annually. Full program details and fellowship applicatons may be obtained from the American Society for Engineering Education, 11 Dupont Circle, Suite 200, Washington, DC 20036, telephone (202) 293-7080. The ASEE is administering the fellowship program for ONR.

U.S. Navy-ASEE Summer Faculty Research Program

Under this program, science and engineering faculty members from universities and colleges spend ten weeks in the summer conducting research at Navy Research and Development Centers. Participants work with professional peers in the Navy laboratories on research tasks of mutual interest. The program's objectives are to engage university faculty members in the research program of the various laboratories, to develop the basis for continuing research of interest to the Navy at the faculty member's institution, to establish continuing relations among faculty members and their professional peers in the Navy, and to enhance the research interest and capabilities of science and engineering faculty members. Program announcements and application forms may be obtained from the American Society for Engineering Education, Suite 200, 11 Dupont Circle, Washington, D.C. 20036; telephone (202) 293-7080.

Mathematical and Physical Sciences Directorate, Code 410

Associate Director
Dr. Ted G. Berlincourt
(202) 696-4212

Mathematical Sciences Division, Code 411

Division Leader
Dr. James C. T. Pool
(202) 696-4310

The Mathematics Group

The Mathematical Sciences Division supports research in mathematics, statistics, probability, operations research, and theoretical computer science. The Mathematics Group emphasizes control theory, large scale systems theory, analytic and computational methods for partial differential equations, the theory of algorithms, mathematical optimization, decision science and mathematical economics. In control theory emphasis is on modeling, development of synthesis techniques allowing for model uncertainty, failure detection and compensation, and direct digital design. Investigations in large scale system theory address issues in distributed estimation and decision problems, distributed data bases, and decentralized communication control. Research on analytic and computational methods for partial differential equations is directed toward the development of techniques for the solution of problems in acoustics, fluid and solid mechanics, and electromagnetic radiation for both the direct and inverse problems. Investigations into the theory of algorithms explore the mathematical foundations of computing, while simultaneously searching for innovative algorithms implementable with very large scale, integrated circuit technology (VLSI). Mathematical optimization research emphasizes theory and software for large scale, linear, nonlinear and integer programs. The related disciplines of scheduling, sequencing and networking are also investigated. Research in decision science develops mathematical methods for multiple criteria objective/utility theory, analysis of risk, team and competitive n-person modeling and organization of information and decision structures. Research in mathematical economics develops methodology for resource planning, investment and costing, negotiation and bidding, and economic conflict modeling.

The Statistics and Probability Group

The Statistics and Probability Group emphasizes mathematical statistics, computational statistics, statistical signal analysis, statistical analysis for remote sensing data, quality assurance and stochastic methods for operations research. Mathematical statistics efforts are basic investigations in robustness, nonparametrics, inference under order restrictions, asymptotic theory and applied probability. Research in computational statistics seeks statistical algorithms for contemporary computer architectures emphasizing high volume and high dimensional data analysis. Simulation methodology is also an important part of this area. Topics in statistical signal analysis include time series, stochastic processes, communication theory, signal processing and multiple target tracking. Satellite technology for environmental remote sensing motivates an emphasis on image processing, pattern recognition, data compression, two dimensional signal processing and inversion methods. Quality assurance research focuses on quality control, reliability and maintainability of complex naval systems. Investigations in operations research include stochastic aspects of logistics, inventory theory and other topics in the production and distribution of naval material.

Physics Division, Code 412
Division Leader
Dr. William J. Condell
(202) 696-4220

The physics program includes theoretical and experimental investigations in atomic and molecular physics, plasma physics, lasers and their applications, electrooptics, radiation transport, radiation interaction, surface and interface physics, and physical acoustics. Some representative examples of aspects of current high interest are high-accuracy time keeping, high-sensitivity detectors, ionospheric and laser plasmas, blue-green lasers, free electron lasers, ultrafast phenomena, relativistic electron beam techniques for generation of intense microwaves and millimeter waves, energetic particle beam generation and propagation, advanced surface and interface analytical techniques, and nonlinear acoustics. Special emphasis is placed on efforts to resolve basic scientific issues, to open new areas for productive research, and to contribute to the solution of problems fundamental to identified and anticipated Navy needs.

Chemistry Divison, Code 413
Division Leader
Dr. George A. Neece
(202) 696-4409/10

The Chemistry Division encompasses the areas of chemical materials, surface chemistry, electrochemistry and chemical analysis. Emphasized under the program are research on materials with unusual properties and the preparation and characterization of inorganic and organic polymers displaying properties such as high environmental stability or electroactivity; interfacial phenomena, surface modification, chemistry of thin films and nonequilibrium materials, and electronic materials fabrication and characterization; electrochemical fundamentals; materials and processes; photochemistry and chemiluminescence; and modern realtime, analytical instrumentation and methodology.

Electronics Division, Code 414
Division Leader
(Vacant)
(202) 696-4216

Within the program in electronic and solid state sciences, research and exploratory development efforts are conducted in electromagnetics, space radiation effects, physical electronics, electronic materials, solid state components, radiation effects in solids, electronic system theory, communication theory, solid state physics, superconductivity and high speed microwave and digital electronic devices and circuits. These efforts emphasize the generation, propagation, scattering and detection of electromagnetic radiation; the study of solar, interplanetary, magnetospheric, ionospheric and atmospheric effects which influence propagation; physical properties and device aspects of electronic materials and structures including surfaces and defects and including fabrication and formation processes such as ion implantation; laser induced surface effects; communication, circuit and system theory including studies of reliability, performance, and efficiency; physical properties of condensed matter; the physics of superconductivity and the operation of Josephson junction superconducting devices; and advancement of high frequency microwave and digital electronic materials, devices and circuits. Emphasis is placed on understanding the basic underlying mechanisms and phenomena and on the potential for opening new areas and opportunities for scientific and technical advances.

Environmental Sciences Directorate, Code 420

Associate Director
Mr. Gordon R. Hamilton
(202) 696-4530

The Environmental Sciences Directorate sponsors research in oceanography, atmospheric sciences, marine geology and geophysics and ocean acoustics with components of the program directed at coastal sciences and the arctic region. The Associate Director and many of the staff are located at ONR headquarters in Arlington; however, much of the effort in oceanography is conducted by our staff at the ONR Detachment in Bay St. Louis, MS under Deputy Associate Director, Dr. Aubrey Anderson (601) 688-4707.

Ocean Engineering Division, Code 421
Division Leader
Dr. Gene Silva
(202) 696-4358

Emphasis is placed on research in two major areas: the development of new oceanographic instrumentation and data gathering techniques in support of the oceanography programs, and the development of new concepts and methods for improving Navy ocean engineering capabilities.

Ocean Science Division, Code 427
Division Leader
Dr. Gene Silva (Acting)
(202) 696-4358

The ocean science program sponsors research in five major areas, including the open ocean, coastal region and the atmostpheric sciences.

Physical Oceanography

Emphasis is on understanding the physical processes responsible for the inherent variability of oceanic features (e.g., major current systems, mesoscale eddies, upper and bottom mixed layers, surface and internal waves, fine and microstructure, and turbulence), including how these features are generated, how they interact with each other, and how they are ultimately dissipated. Development of the instruments to research and survey these features is included. The ultimate desired products are numerical prediction models of the ocean.

Chemical Oceanography

Emphasis is on the small-scale distribution of the trace elements, including their sources, sinks, and biological interactions; processes and mechanisms governing the inorganic composition of seawater; and measurement of chemical fluxes through the marine environment.

Ocean Biology

Emphasis is on upper ocean biomass variability and its underway measurement via newly developed optical and acoustical techniques, parameterization and

measurement of bioluminescence, biodeterioration, microbial fouling processes, and biological alteration of sediment dynamics.

Coastal Sciences

The Coastal Sciences Program sponsors research related to improved capabilities for observation, prediction and display of coastal environmental conditions important for naval operations and systems on a worldwide basis. Environmental components studies include tides, currents, waves, deltas, beaches, estuaries and continental shelves. Emphasis is on improved understanding of dynamic coastal processes and methods of data acquisition (including remote sensing), storage, analysis, and display and on the development of environmental prediction modes. Included are terrain and shallow water bathymetric analyses, including new geographic orientation techniques and new approaches to shallow subsurface terrain assessment.

Atmospheric Sciences

This program sponsors research on atmospheric factors which affect naval operations and systems. The research includes remote sensing of atmospheric properties and composition and cloud physics studies aimed at improvement of the mesoscale forecast; solar reaction studies to extend the conventional forecast and testing and development of climatic models for better support of strategic planning; investigations of marine boundary layer processes to improve fog forecasting and to define optical and electromagnetic transmission properties in the marine boundary layer; independent examination of weather modification experiments for assessment of progress; and lightning studies for better protection techniques. The Atmospheric Sciences Program utilizes and operates a number of unique scientific data gathering research platforms including aircraft and balloons.

Geophysical Sciences Division, Code 425

Division Leader
(Vacant)
(202) 696-4395

The geophysical sciences division sponsors research in acoustics, marine geology and geophysics and the arctic.

Arctic Research

The arctic research program sponsors research related to environmental factors (terrestrial, atmospheric, ionospheric, and oceanographic conditions, currents, ambient and man-made noise, bottom composition, tectonic fabric, geopotential surface, ice roughness, etc.) that affect naval operations and systems in the Arctic Ocean and peripheral areas. The program also includes prediction capabilities for major water and ice movements, for ice growth and decay, for origin and extent of aerosols and for electromagnetic propagation in the arctic and peripheral maritime areas.

Marine Geology and Geophysics

Emphasis is on very low frequency sound propagation in the seafloor including research with mobile and fixed seismic arrays, ocean bottom and downhole seismometers; seismic inversion techniques; studies of seafloor structure including bathymetric (especially seamount) trends, magnetic anomaly trends and new measurement techniques, and the relationship of altimetry and sea surface gravity data; studies of sediment dynamics with emphasis on high velocity benthic boundary layer flows and their control of seafloor morphology and properties of near-bottom water.

Ocean and Underwater Acoustics

Emphasis is on the quantitative prediction, calculation or measurement of the effect on sound propagation of oceanic phenomena both in the water column and in the seafloor.

Engineering Sciences Directorate, Code 430

Associate Director
Dr. Arthur M. Diness
(202) 696-4407

The scope of the Engineering Sciences Directorate includes experimental and theoretical investigations in materials, mechanics and information sciences. The component parts of these programs which are of high interest are listed within the program descriptions for each of the component divisions. Special attention is placed across the Directorate on research aimed at resolution of basic engineering science issues, exploration of new areas or new approaches for research, and the advancement of present and anticipated Navy and Marine Corps needs in the engineering sciences. Encouragement is given to interdisciplinary approaches to complex problem areas. Examples of such areas now included in the engineering sciences directorate are: the science base for materials fabrication, life assurance, failure avoidance and reliability research, acoustic silencing and absorption, production, precision and automation engineering research, and advanced propulsion concepts.

Materials Division, Code 431

Division Leader
Dr. C. T. Lynch
(202) 696-4401

This program covers the physics, chemistry, and processing science of metals, ceramics, glasses, composites, and related solids. Emphasis is on structure-property relationships. The primary focus is on improving materials for naval and marine requirements for structural, propulsion, transducer, electromagnetic, and optical systems. Special research emphasis is in the areas of novel processing techniques and processing science, welding and adhesion science, environmental degradation, protective coatings, tribology, strength and toughness of materials, materials reliability, piezoelectric, dielectric, and optical ceramics, composite materials, and generally improving the fundamental base for advanced materials development, characterization, and evaluation.

Mechanics Division, Code 432
Division Leader
Dr. A. D. Wood
(202) 696-4403

The Mechanics Division supports research in fluid mechanics, solid mechanics, and propulsion and energetics.

Fluid Mechanics

The fluid mechanics program includes experimental, theoretical and computational research in the fundamental physics of fluids, ship hydrodynamics, geophysical fluids, and high speed aerodynamics. Fluid physics research focuses on basic aspects of turbulence, cavitation, boundary-layer stability and transition. Wave resistance, free-surface waves, ship-wave interactions, and seakeeping are emphasized in ship hydrodynamics research. Geophysical fluid dynamics concentrates on wind-wave relations and other micro-scale interactions whose aggregate comprise large scale oceanic phenomena. Aerodynamics research focuses on compressible fluid dynamics in the transonic, supersonic and hypersonic regimes.

Solid Mechanics

In solid mechanics, consideration is given to both materials and structures under static, vibratory, and dynamic loadings, in the presence of various thermal, fluid and other nonmechanical influences. The program includes research in methods of stress and buckling analysis; constitutive equations reflecting rate sensitivity, cyclic and thermal effects; composite materials; wave propagation, shock, and impact; structural acoustics; fatigue and fracture, as well as non-destructive techniques for evaluation of materials and structural behavior.

Propulsion and Energetics

The work in propulsion and energetics involves energy sources and their utilization with respect to armaments and propulsion systems for aircraft, missiles, and ships, together with life assurance aspects of such systems. Included are research on the dynamic, physical and chemical properties of energetic materials for propellants and weapons, studies of seals and bearings, complex internal flow phenomena, combustion processes, and alternate fuel utilization.

Information Sciences Division, Code 433
Division Leader
Mr. Marvin Denicoff
(202) 696-4303

The information sciences program includes artificial intelligence, robotics and advanced automation, software engineering, computer architecture, and user-machine interfaces.

Artificial Intelligence

Artificial intelligence explores research in such areas as: computer representation and acquisition of world knowledge, common sense reasoning, machine learning and adaptation, negotiation, and natural language text and speech understanding. Particular attention is paid to the design of "expert systems."

Robotics and Advanced Automation

Robotics and advanced automation research emphasizes the knowledge bases needed to achieve smart robots with capabilities of reasoning and vision, manipulation, and mobility. It exploits artificial intelligence, computer software, and microelectronics in order to advance flexible automated systems which are capable of performing spatial planning and anomoly recognition, are adaptive and self-programmable, can process 3-D objects, and can exercise control over a network of distributed, cooperative robots. A principal concern is the development of robotics systems for relatively unstructured environments. A major goal in this area is research aimed at achieving dramatic improvements in fabrication, reliability, and precision engineering of manufactured products.

Software engineering

Software engineering seeks a scientific foundation and understanding of the life cycle process of software. Emphasis is centered on establishment of scientific methodologies to enable improvements in the cost of quality of computer software products. Research topics include: automated programming, program testing and validation, database design, computer languages, programmer tools, computer networks, characterization of the programming environment, metrics for evaluating the software development process and products, and distributed processing.

Computer Architecture

Computer architecture interests include highly parallel computation, architectures in support of novel programming concepts, languages and graphics for automating the design of integrated circuits, methodologies to facilitate the integration of special purpose chips for specific applications, and memory systems.

User-Machine Interface

User-machine interface research has the primary objective of providing both facile and flexible modes of communication between decision makers and computers. The current focus on management support systems and office automation addresses such issues as: research on menu selection systems, speech input, and natural language dialogues to maximize choice in the form of the interaction, research on personal computers, color graphics and automated management alerting systems.

Life Sciences Directorate, Code 440

Associate Director
Dr. Glenn L. Bryan
(202) 696-4741

Biological Sciences Division, Code 441

Division Leader
CAPT R. K. Ohslund
(202) 696-4742

The Biological Sciences Division supports Navy-relevant basic research in the disciplines of microbiology, environmental biology, biochemistry, biophysics, physiology and bioelectromagnetics. The program thrusts are directed toward understanding the effects of stress on biological systems, the mechanisms of biosystem recovery from stress, biological interactions with naval environments, and the mechanisms involved in central nervous system function. Specific areas of increased emphasis involve the stress of cold weather operations, the immobilization of enzymes with naval application, chemical and biological warfare defense, human response and biomedical applications of electromagnetic fields and the function of the human immune system.

The Division is comprised of three research groups which interact on a continuing and dynamic basis.

Physiology

The physiology program is directed toward providing a comprehensive insight into human physiological functions and responses to environmental stress. Among the stresses of naval concern are temperature, extreme atmospheric pressures, acceleration, noise, vibration, fatigue, sleep fragmentation, sensory overload and monotony. A broad spectrum of research involves pertinent cardiovascular, pulmonary, neural and endocrine physiology, the psychophysiological correlates of stress, and the neural basis for information processing, learning and memory. Research is required at the cellular, organ and system level of animals and/or humans.

Molecular Biology

The molecular biology program supports basic research in molecular genetics, microbiology, and immunology. The major objectives of the program are to expand the technological base in areas which will have applications towards: (1) improving the ability of Navy and Marine Corps personnel to conduct operations in hazardous environments and (2) utilization of recent advances in biotechnology to solve a variety of Navy problems in the non-medical arena. Current thrusts are directed at: (1) new techniques for rapid identification and characterization of antigenic substances, (2) regulation of the immune system, (3) structural modifications of macromolecules to improve stability and activity, (4) new methods of controlling biologically degradative or corrosive processes.

Cellular Biology

The cellular biology program deals with understanding metabolic and repair processes at the cellular level which underlie human responses to environmental stress, toxic substances, injury, trauma and disease. The approaches to these processes include the biochemistry of protein structure-function relationships to obtain a better understanding of the mechanisms of an action involved in cellular regulatory processes, the macromolecular biophysics of membranes, communication of inter- and intra-cellular signals and the physical and chemical effects of environmental factors at the cellular level.

Psychological Sciences Division

Division Leader, Code 442
Dr. Martin A. Tolcott
(202) 696-4743

The Psychological Sciences Division supports basic and applied research in manpower, personnel, training and human factors engineering. The program thrusts are aimed at theories underlying human cognitive and learning processes, effects of advanced instructional and testing techniques, system design features and organizational factors affecting productivity and commitment. Increasing emphasis is being given to research on the relations between artificial and human intelligence, human interactions with computer-based systems, and innovative approaches to assessing and facilitating individual and group effectiveness in the workplace. An interdisciplinary program on the neural basis for learning and memory is being initiated.

The Division consists of three research groups.

Engineering Psychology

The engineering psychology research program investigates selected aspects of human performance as it is influenced by design features and operational procedures of naval equipment and systems. The approaches include theoretical and experimental research aimed at advancing fundamental understanding of human perceptual, decision-making and psycho-motor behavior and deriving human factors engineering principles for the design of compatible interfaces between people and their equipment. It also involves the development of new methods for assessing and predicting the effects of high technology systems upon human performance. The objective is to assure effective performance by personnel operating and maintaining equipment characteristic of modern Navy and Marine Corps systems.

Organizational Effectiveness

The organizational effectiveness research program contributes to the knowledge base for future Navy and Marine Corps human resources programs. At the individual level, there is particular interest in: (1) ways of measuring the motivation to work in highly demanding training and operational settings, and of increasing such motivation by devising innovative incentive programs, organizational environments, and leadership tactics; (2) recruitment and retention of personnel with relevant technical interest and abilities; and (3) novel techniques for increasing the ability of the worker to cope more effectively with job stress generated by long hours, family separation, rigorous discipline, harsh environments, etc. At the group level, research is needed on: (1) ways to augment communication and decision-making effectiveness in work teams exposed to high information loads under pressure of time and environmental threat, in situations in which individuals may be physically separated from each other; and (2) leadership of personnel from widely varying educational and cultural backgrounds in high-technology organizations. At the organizational level, research is needed on factors that determine the productivity of high-technology organizations operating in an environment of rapid social and technological change. While most of this research falls in the area of organizational behavior, we also support research involving social psychology, sociology, and anthropology. Methodological approaches include laboratory and field experiments, archival research, behavioral observation in situ and simulations.

Personnel and Training

The personnel and training research program supports research on aptitude and achievement testing, human learning, understanding and reasoning, and advanced instructional theory and techniques. In testing research, current emphasis is on the psychometric basis of ability and achievement testing, especially as it pertains to adaptive computerized tests. Research on human learning investigates relationships among fundamental information-processing operations, control of these operations, and learning of complex tasks which rely on them. Cognitive analyses are made of Navy relevant skills such as electronics troubleshooting that demand complex information processing. Computer simulations and other formal models are developed to study the knowledge structure and cognitive processes that support skilled performance. Research on innovative "intelligent" computer-based instruction is concerned with theory and techniques for on-line tutoring and simulation of complex systems. Research is also conducted on the structure, content and comprehensibility of instructional materials typical of those used in Navy training and education.

Technology Project Offices

Aviation and Aerospace Technology Code 210

Project Manager
CAPT Marshall A. Howard, USN
(202) 696-4713

Applied research applicable to advanced aircraft and spacecraft, including aerodynamics, air delivered weaponry, propulsion, guidance and control for both weapons and aircraft, surface and aerospace surveillance, detection, classification, and targeting, and directed energy devices.

Undersea Technology Code 220

Project Manager
CAPT Arthur H. Gilmore, USN
(202) 696-4713

Applied research and development applicable to undersea warfare, including underwater acoustics, sensors, weapons, countermeasures, platforms, and vehicles. Nonacoustic sensor and device technology for underwater use are assigned to this office. Oceanographic research and development including the air-water interface are also under the cognizance of this project office.

Tactical Development, Evaluation & Support Code 230

Project Manager
Mr. Richard A. Nagelhout
(202) 696-4411

Tactical operations analyses aimed at finding more effective ways of using existing Navy and Marine Corps combat systems; operations analyses to evaluate potential tactical effectiveness improvements that could be realized through applications of emerging technologies; operations analyses aimed at identifying implications for new technologies, which, if brought to fruition, could result in improved tactical effectiveness; and other analyses contributing to the development and maintenance of future naval power.

Communication and Computer Technology Code 240

Project Manager
Mr. Joel Trimble
(202) 696-4713

Applied research and development applicable to: communications and computational technology including the functional area of command and control which includes the processing and display of information, tactical and strategic communications, and navigation technology. Both device and systems technology is included. The focus is on supporting emerging technology from basic research and the transition to more advanced development.

Electronic and Electromagnetic Technology Code 250

Project Manager
Mr. David S. Siegel
(Acting)
(202) 696-4713

Applied research applicable to electronic devices and electromagnetic technology. The Electronics and Electromagnetics Technology Project sponsors Applied Research and Development projects in the areas of microwave integrated analog circuits and devices; solid state digital devices; passive components; cryogenic and superconducting devices and circuits. Of special interest are those device concepts that provide affordable, maintenance-free system applications.

Materials Technology
Code 260

Project Manager
Mr. David S. Siegel
(Acting)
(202) 696-4713

The materials technology project sponsors exploratory development projects in the areas of metallurgy and ceramics, chemistry, power and structural mechanics which capitalizes on research results stemming from Navy basic research efforts in the material and chemical sciences. Emphasis is directed on developing the naval applications potential of new and innovative materials, fabrication processes, non-destructive test and evaluation techniques, and structural concepts. Of special interest are those materials, processes and techniques which lead to greater device or hardware reliability, maintainability, performance and lower costs.

Manpower, Personnel, Training Technology
Code 270

Project Manager
CDR Patrick
M. Curran, USN
(202) 696-4713

Applied research applicable to manpower and personnel management, policies, and procedures, computer-aided education and classroom training; man-machine systems; and biomedical factors affecting personnel performance. The focus is on supporting emerging technology from basic research and the transition to more advanced development or directly to the user.

Proposals

Advanced Conformal Submarine Acoustic Sensor
Code 280

Project Manager
CAPT Arthur H. Gilmore, USN (Acting)
(202) 696-4713

Applied research, analysis, and experimental measurements applicable to all aspects of the optimization of the design and feasibility demonstration of a large acoustic sensor for submarine applications.

Any qualified scientist, institution, or organization may present a research proposal to the Office of Naval Research. The majority of proposals received are unsolicited.

An unsolicited proposal is a written offer to perform a proposed task or effort, initiated and submitted to the Government by a prospective contractor (offeror) without a solicitation by the Government, with the objective of obtaining a contract.

Preliminary correspondence, including inquiries for the purpose of ascertaining Government interest in research areas, preproposal explorations, technical inquiries or research descriptions, submitted prior to the preparation of a formal proposal are encouraged to establish areas of mutual interest and avoid costly proposal preparation.

Formal or informal proposals should be addressed to the appropriate division selected from among those listed in this booklet. In addition, educational institutions are encouraged to provide an information copy directly to the ONR field representative responsible for contract administration. The address for the cognizant field representative may be obtained by calling the nearest ONR office listed on the last pages of this booklet.

The Office of Naval Research does not maintain a bidder's list. There is a Small Business

To receive proper evaluation by the Office of Naval Research, formal proposals should contain the following minimum information:

Specialist available to assist prospective contractors in the preparation and presentation of proposals. His phone number is (202) 696-4601.

Basic Information:

- the name and address of the offeror (if an organization, indicate type, e.g., profit, non-profit, educational, small business);
- names and telephone numbers of the offeror's technical and business personnel who may be contacted by ONR for evaluation or negotiation purposes;
- identification of any data which the offeror intends to be used by ONR only for evaluation purposes; the data which the offeror wishes to restrict shall be marked with a legend in accordance with the Defense Acquisition Regulation 3-507.1(a), which is set forth on the last page of this booklet;
- names of any other federal, state, local agencies, or other parties receiving the proposal and/or funding the proposed effort or activity;
- signature of a responsible official or authorized representative of the organization or a person authorized to obligate the organization contractually; and
- date of submission.

Technical Information:

- a concise title and an abstract (approximately 200 words) of the proposed effort;
- a brief review of the scientific background of the proposed investigation;
- a discussion stating the objectives of the effort or activity, the method of approach and extent of effort to be employed;
- the names of and brief biographical information on the offeror's key personnel (including alternates, if desired) who would be involved;
- any special support the offeror requests of the Government, e.g., facilities, equipment, materials, or personnel resources;
- a description of general and special facilities available for performing the contemplated work; and
- a bibliography of pertinent publications.

Supporting Information:

- a proposed price or total estimated cost;
- a cost estimate breakdown for the proposed effort sufficiently detailed by element of cost for meaningful evaluation;
- the type of contract preferred;
- period of time for which the proposal is valid (a minimum of six months is suggested);
- proposed duration of effort;
- other research and development projects currently being undertaken by the principal investigator; and
- statements, if applicable, regarding cost sharing, organizational conflicts of interest, security clearance status, and environmental impacts, and brief descriptions of the organization's previous work or experience in the field

of the proposal, and facilities to be utilized for the work, where appropriate for understanding the proposal.

Special Information for Animal Experiments:

- the proposal must include the rationale for using the animal species involved, procedures to be used, and a discussion of pain causation, control, or prevention;
- the proposal must include evidence of contractor knowledge and capability to comply with established local and federal policy on use of animals; and
- the proposal must include a plan for collection and reporting of animal use data certified by an appropriate institutional committee on an annual basis. (Detailed guidance may be requested from Division Leader, Biological Sciences Division.)

Special Information for Human Experimentation:

- any proposal which involves the experimental use of human subjects must include a separate evaluation of technical approach and risks by the organization's committee on the use of human subjects.
- this evaluation must conform with current Department of the Navy instructions relating to the use of human subjects. (Detailed guidance may be requested from Division Leader, Biological Sciences Division.)

All formal proposals received by ONR are evaluated and processed. Several different procedures are used in evaluating proposals depending upon the scientific discipline involved.

Contracts and Grants

Research may be supported by ONR through the use of a contract or a grant. Contracts are used with both nonprofit organizations and commercial organizations. Grants may be made only to nonprofit institutions of higher education or to nonprofit organizations whose primary purpose is the conduct of scientific research. Grants may not be made to individuals and are normally used only to provide partial support for research efforts such as conferences or symposia.

ONR Contracts

ONR contract procedures are subject to the requirements of the Defense Acquisition Regulation. The selection of the type of contract, either cost or fixed-price, is based on various factors, such as the type of research to be performed and the contractor's experience in maintaining cost records. A document commonly used by ONR in supporting research with universities is a cost reimbursement type of basic agreement against which individual contracts may be issued. Cost-plus-fixed-fee contracts are used in appropriate cases with commercial contractors. Fixed price contracts are used when the research project costs can be estimated accurately, the services to be rendered are reasonably definite, and the amount of Government-furnished property, if any, is fixed.

ONR Grants

The ONR grant is a written agreement executed by both the Government (grantor) and the institution (grantee). Normally the grant document will contain a limited number of express conditions relating to funds, method of payment, general nature and scope of the research, patents and copyrights, revocation, and other related matters. It is expected that each grantee will maintain accounting records, in accordance with generally accepted accounting practices, which will permit determination that the funds were used for the purpose for which the grant was made. As a general rule ONR grants contain a provision which requires the grantee, upon completion or revocation of the grant, to furnish to the Government a financial statement showing a breakdown of expenditures made in the performance of the grant. Such financial statement may be in the same form and detail as contained in the grantee's approved proposal for the grant.

Reports Policy

A basic tenet of ONR is that an investigation is not complete until the investigator has reported his results in all necessary detail. Initial distribution of the research report is normally made by the investigator.

Copies are furnished to the Defense Technical Information Center. Subsequent distribution to DOD agencies and their contractors is made by the Defense Technical Information Center on a request basis. All unclassified, unlimited reports are accessioned by DTIC and released immediately to the National Technical Information Service to catalog and abstract for announcement in the subscription journal, "U.S. Government Reports Announcements," and are available for sale to the public.

Inquiries on NTIS services may be directed to NTIS, 5285 Port Royal Road, Springfield, VA 22161 (703-557-4600). DTIC and NTIS services include: providing copies of technical reports, report bibiographies, subject searches, resumes of active R&D efforts, and other products.

Investigators' technical reports must be capable of reproduction by microfilm and photo-enlargement methods. In addition, contractors are expected to be guided by "Government Printing and Binding Regulations," published by the Joint Committee on Printing of the Congress of the United States.

Scientific information
developed under ONR contracts
and grants is made available to
the scientific community
through publication in scientific
and technical journals and
through publication in books.

Offices of Naval Research

Headquarters

The Office of Naval Research has its headquarters in Ballston Centre Tower #1, located at 800 North Quincy Street, Arlington, Virginia 22217. A senior technical representative at this address has collateral responsibility to assist small firms to participate in the Navy's research and development program. His telephone number is (202) 696-4601.

Field Offices

The Office of Naval Research has scientific offices in Boston, Pasadena, London and Tokyo. In addition, ONR contract administration representatives are located in Boston and Pasadena and at or near major universities and institutions across the United States. These offices provide direct liaison between the Office of Naval Research and scientific institutions in their areas. The scientific and contract administration components of the field offices are prepared to advise and assist prospective contractors in preparing proposals. The offices also have patent counsel who are able to answer questions of contractors or grantees on patent and copyright matters.

London and Tokyo Offices

The London Branch Office and the Tokyo Scientific Liaison Office serve all echelons of the U.S. Navy in matters relating to science and technology overseas. ONR London and ONR Tokyo have the primary responsibility for observing and reporting scientific and technological developments in Europe, the Middle East and the Far East; establishing contacts between American and foreign scientists in these areas; and providing liaison between the U.S. and foreign scientific communities in fields of interest to the U.S. Navy.

Publications on Foreign Science

Observations on foreign science—resulting from visits to universities, government and industrial research centers, and from participation in scientific meetings—are disseminated by both the London and Tokyo offices in the form of unclassfied monthly and quarterly publications, as well as in the form of special topical reports. Requests for these publications should be addressed directly to the overseas offices.

Mail from the U.S. to ONR London may be addressed as follows:

Commanding Officer
Office of Naval Research
Branch Office
Box 39
FPO New York, New York
09510

The local address of ONR London is:

Edison House
223 Old Marylebone Road
London NW1 5TH
England

Mail for the ONR office in Tokyo should be addressed:

U.S. Office of Naval Research
Liaison Office, Far East
APO San Francisco 96503

Additional information concerning the contract research program may be obtained from either office listed on the following page.

Regional Offices

Boston

Office of Naval Research
Detachment
Barnes Building
495 Summer Street
Boston, Massachusetts 02210

Telephone

Officer in Charge
(617) 451-3152
Scientific Department
(617) 451-3167
Director for Contract Administration
(617) 451-3161

Pasadena

Office of Naval Research
Detachment
1030 East Green Street
Pasadena, California 91106

Telephone

Officer in Charge
(213) 795-5971 Ext. 50
Scientific Department
(213) 577-7214
Director for Contract Administration
(213) 577-7112 Ext. 60

ONR Laboratories

The Office of Naval Research's major in-house research and development activities are the Naval Research Laboratory (NRL) and the Naval Ocean Research and Development Activity (NORDA). In addition, the Naval Material Command and the Naval Medical R&D Command also operate laboratories which are listed in the booklet "Selling to the Military" available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 008-000-00226-6.

NRL

The Naval Research Laboratory conducts a broadly based multidisciplinary program of scientific research and advanced technological development directed toward new and improved materials, equipment, techniques, systems, and related operational procedures for the Navy. Inquiries regarding contracting opportunities should be made to:

Small Business Specialist,
Code 2490 (SUPPLY)
Naval Research Laboratory
4555 Overlook Avenue, S.W.
Washington, D.C. 20375
(202) 767-2914

NORDA

The mission of the Naval Ocean Research and Development Activity, located in Bay St. Louis, Mississippi, is to carry out a broadly based RDT&E program in ocean science and technology, with emphasis on understanding ocean processes through measurement and analysis, and the effects of the ocean environment on Navy systems and operations. Contractual support for NORDA research efforts is provided by ONR Headquarters. Inquiries regarding NORDA contracting opportunities may be made to ONR's Small Business Specialist, telephone (202) 696-4601.

NBL

The Naval Biosciences Laboratory conducts basic research and development in the biological sciences related to the environmental impact and biodegradation of hazardous materials, rapid identification and characterization of antigens, and basic microbial genetics, cellular and molecular biology with an emphasis on recombinant DNA technology for the biomolecular engineering of specific macromolecules for naval applications. Inquiries may be made to ONR's Biological Sciences Division, telephone (202) 696-4058.

Suggested Legend

"This data shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed in whole or in part for any purpose other than to evaluate the proposal; provided, that if a contract is awarded to this offeror as a result of or in connection with the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the contract. This restriction does not limit the Government's right to use information contained in the data if it is obtained from another source without restriction. The data subject to this restriction is contained in Pages ___________."

The offeror shall mark each sheet of data, which he wishes to restrict, with the following legend:

"Use or disclosure of proposal data is subject to the restriction on the Title page of this Proposal."

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